Herpetological Inventories at Devils Tower, Jewel Cave, and Scotts Bluff National Monuments, Mount Rushmore National Memorial, Fort Laramie, Fort Union Trading Post, and Knife River Indian Villages National Historic Sites, and the Missouri National Recreational River.

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PROJECT STATEMENT:
The Northern Great Plains (NGP) Network has determined that herpetological inventories are needed at Devils Tower, Jewel Cave, Scotts Bluff National Monuments (NM), Mount Rushmore National Memorial (NMEM), Fort Laramie, Fort Union Trading Post, and Knife River Indian Villages National Historic Sites (NHS), and the Missouri National Recreational River. The NGP Network made this determination based on literature reviews, documented species at the park, scoping workshops, expert opinion, and a comparison of documented species lists to expected species lists. Justification for the project is described in detail in the Northern Great Plains Inventory Study Plan (Study Plan). The Principle Investigator is required to review the Study Plan before conducting field work. The Principle Investigator is also required to contact park staff prior to conducting field work at the park (contact the Network Coordinator or see the Study Plan for a list of park contacts).

Appendix F of the Study Plan lists the reptile and amphibian species documented at each of the above parks, and the species expected to be there, but not yet documented (although this list is reasonably close to complete, the Principle Investigator is advised to contact the NGP Network Coordinator for the most recent data). The primary purpose of the proposed field inventories is to document those species not yet documented at the parks, however, it is expected that the field inventories will also verify the current presence of already-documented species, and provide additional information on relative abundance, distribution, and habitat use.

Detailed information on the parks included in this project statement, and the status of existing inventories, can be found in the Study Plan. In summary, the status of the parks in regards to reptiles and amphibian inventories is:

- Devils Tower NM - 50% documented. undocumented list is 9 species (3 turtles, 3 anurans, 1 lizard, 1 snake, 1 salamander). habitat is the Tower, ponderosa pine forest, cottonwood floodplain, river, and a prairie dog town. 1360 acres
- Fort Laramie NHS - about 35% documented. undocumented list is 16 species (6 snakes, 1 anuran, 5 lizards, 3 turtles, 1 salamander). habitat is wheatgrass, disturbed areas, and riverine. 833 acres
- Fort Union Trading Post NHS - need complete inventory. undocumented list is 19 species (7 anurans, 7 snakes, 2 turtles, 2 lizards, 1 salamander). habitat is riparian woodland, riverine, and native and restored prairie. 450 acres
- Jewel Cave NM - about 25% documented. undocumented list is 5 species (3 snakes, 1 anuran, 1 salamander). ponderosa pine forest. 1355 acres
- Knife River Indian Villages NHS - about 60% documented. undocumented list is 6 species (3 snakes, 2 turtles, 1 anuran). habitat is forested floodplain and mixed-grass prairie. 1758 acres
- Missouri National Recreational River - need complete inventory. undocumented list is 27 species (10 snakes, 9 anurans, 5 turtles, 2 lizards, 1 salamander). habitat is upland, riparian forest, and riverine. 33,839 acres
- Mount Rushmore NMEM - need complete inventory. only 6 species on expected list (4 snakes, 1 anuran, 1 salamander). ponderosa pine forest. 1238 acres

- Scotts Bluff NM - at 80% documented. undocumented list is 4 species (2 anurans, 2 lizards). habitat is badlands juniper, mixed-grass prairie, prairie dog town, riparian cottonwood forest, riverine. 3003 acres
- For the eight parks as a whole, 35% of the undocumented species are snakes, 30% are anurans, 16% are turtles, 12% are lizards, and 6% are salamanders. The methods proposed are designed to take advantage of this breakdown.

OBJECTIVES:

- Document the presence of those reptile and amphibian species not yet documented at the parks so that at least 90% of the expected species at a park have been documented.
- Conduct the inventories in a way in which it is reasonably certain that those species not documented in the inventories are likely not at the park and may be removed from the expected species list.
- Conduct the sampling in a way that inferences can be made about the distribution and relative abundance of the reptile and amphibian species of the park.
- When appropriate, acquire voucher specimens for species captured in each park (following the guidance in the Study Plan).
- Document amphibian deformities, if present.
- To the extent possible, locate and map breeding, feeding, and over-wintering areas.
- Collect relevant supporting data (e.g., moisture conditions).

METHODS:

The primary method used to search for reptiles and amphibians will be time/area constrained searches (TACS). Parks will be stratified by habitat so that all appropriate habitats are searched. The habitats to stratify by for the TACS are:

- Devils Tower NM: (4) ponderosa pine, grassland, prairie dog, riparian/green ash/cottonwood
- Fort Laramie NHS: (3) riparian forest, grassland, wetland/riverine
- Fort Union Trading Post NHS: (3) riparian forest, grassland, wetland/riverine
- Jewel Cave NM: (2) ponderosa pine unburned, ponderosa pine burned
- Knife River Indian Villages NHS: (2) riparian forest, grassland
- Missouri National Recreational River: (4) riparian forest, grassland, bluffs, wetlands/riverine
- Mount Rushmore NMEM: (1) ponderosa pine forest
- Scotts Bluff NM: (3) badlands topography, grassland, riparian forest
- The Principle Investigator shall contact the Network Coordinator for vegetation maps to be used for stratification.
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Each strata will be searched for 12 hours in the spring, summer, and fall. It is recommended that the 12 hours be split 50:50 between diurnal and nocturnal searches (the diurnal searches should be conducted first to better familiarize oneself with the habitat). Surveyors will focus on areas and features that are most likely to contain herps (e.g., under rotting logs). Detailed metadata will be kept on the location and amount of area searched, time of the search, weather, and other factors. Approximately 750 hours will be spent cumulatively on preparing for and conducting the TACS.

Cover boards will be used only at Fort Laramie NHS, Fort Union Trading Post NHS, and Missouri National Recreational River (these parks have expected species that can be inventoried using the method). A grid of cover boards (30 X 30 X 5cm) will be placed based on a stratified random sampling design using the habitats described for the TACS (with the exception of the wetland/riverine habitats). Adjustments to the random approach may be necessary at the Missouri National Recreational River if access is restricted. For all parks, select "hot spots" identified by trained herpetologists may be targeted for additional sampling effort if they are not adequately covered by the random sample in the opinion of the investigators. The cover boards will be placed out as early as possible in the spring. Three transects of 20 boards each, spaced 5m apart, will be placed in each habitat type. While placing and conducting cover board surveys researchers will also employ non-systematic searches including the turning over of rocks, logs, and other potential cover in suitable habitat. Cover boards will be checked twice in the spring, summer, and fall.

Cover boards will be removed in the fall (following the last TACS). Approximately 180 hours will be spent preparing and monitoring cover boards. (The Principle Investigator should work closely with the Network Coordinator and park staff to coordinate assistance in monitoring cover boards. This may reduce the number of visits to a park required by the Principle Investigator.)

Calling surveys will be used to document the presence of anurans and to record information on relative abundance. Due to the linear and complex nature of the riverine habitats, the sparseness of wetlands in the parks, and the primary objective of recording presence/absence, a non-systematic survey will be used. Investigators will cover as much of the parks as possible while recording anuran calls. The exception is the Missouri National Recreational River where representative sites will be surveyed. Surveys will be conducted from dusk until three hours after dusk. Each park will be surveyed once in the spring, summer, and fall, except for the Missouri National Recreational River. That park will be surveyed twice during each period. Calling surveys will be conducted at Devils Tower NM, Fort Laramie NHS, Fort Union Trading Post NHS, and the Missouri National Recreational River. Approximately 80 hours will be spent preparing for and conducting the surveys. Audio recordings will be made for purposes of documentation.

Road driving for purposes of surveying reptiles and amphibians will be conducted only at the Missouri National Recreational River (the other parks are too small to conduct systematic road surveys). However, investigators should be cognizant of herpetofauna while traveling in all parks and the opportunities to collect species. The tiger salamander is an expected but undocumented species at many parks; this species is frequently observed crossing roads during nocturnal periods following rain events (we strongly recommend initiating the survey following a strong rain, if possible). Road surveys at the Missouri National Recreational River will be conducted starting at dusk. The route will be 50 miles long (segments of road outside the park boundary notwithstanding). The route will be surveyed twice in the spring, summer, and fall. The survey will be driven at 15 to 20 mph. All herps observed will be recorded along with their location. The location of the observations will be recorded with the use of GPS. Since the remaining parks are too small for conventional driving surveys, observers will walk roads with flashlights looking for herps. Numerous passes made be made in one night. Data collection will be the same as the road driving survey (e.g., use GPS to record locations). Although this method is similar to the TACS it may document additional species because of the unique characteristics of roads. Approximately 80 hours will be spent preparing for and conducting this survey.

For all herpetofauna surveys the location data (e.g., site of observation, site of cover board) will be recorded using GPS equipment with an accuracy of approximately 15 meters. All location data should be recorded in Universal Tranverse Mercator coordinates (UTM).

The Principle Investigator is encouraged to be adaptable and flexible in the methods used. If the investigator feels that another method will better document a species then the investigator shall contact the Network Coordinator and re-evaluate the methods used. Other methods not explicitly addressed in this project statement, but which may be considered include collecting tadpoles and the use of nets for aquatic turtles. The Principle Investigator is encouraged to review the Study Plan and the references cited below. For those parks that adjoin or are in the vicinity of U.S. Forest Service property (Jewel Cave and Devils Tower NM, Mount Rushmore NMEM), the Principle Investigator will coordinate the herpetofauna inventories with the U.S. Forest Service to the maximum extent possible (e.g., concurrent inventories). This should increase the sample size and/or allow for inferences across space and management practices. Voucher specimens will be preserved in jars, stored, and when requested, forwarded to the Network Coordinator or other site designated by the Coordinator. The Northern Great Plains I&M Network will enter the data collected from the field inventories into NPBib, NPSpecies, and the Dataset Catalog. In addition, NPS will transform spatial data into Arcview formats. The Principle Investigator needs to work closely with the NGP Network Coordinator to ensure that data is recorded in a way that is conducive to these data sets and software applications.

The Principle Investigator shall work closely with the Network Coordinator in all facets of the study. The NPS will contribute significantly to the study. This contribution may consist of field assistance by the Network I&M Program and park staff, use of spatial data, supplies, and other assistance.

The Network I&M Coordinator will ensure that all field inventories that could effect natural or cultural resources will be preceded by a thorough assessment of potential impacts and completion of appropriate compliance documentation. The compliance process will follow guidelines described in the Study Plan and those provided by the I&M WASO office and Director's Orders-12.

PRIMARY REFERENCES:

Heyer, W. R., M. A. Donnelly, R. W. McDiarmid, L. C. Hayek, and M. S. Foster. 1994. Measuring and monitoring biological diversity: standard methods for amphibians. Smithsonian Institution Press, Washington. 364pp.

Ministry of Environment, Lands and Parks, Resources Inventory Branch. 2001. Species inventory database. Prepared for the Terrestrial Ecosystems Task Force Resources Inventory Committee. Version 2.0. Government of British Columbia. http://www.elp.gov.bc.ca/rib/wis/spi/

PRODUCTS:

The Principle Investigator will provide the following products:

- Annual (where applicable) and Final reports (11 copies) for inventories in standard scientific format including an introduction, detailed methodology, results, list of species, and discussion. Analysis of the completeness of the surveys will be included in the report. Reports should be in MS Word format.
- Original field notebooks, notes, and photographs along with accompanying documentation.
- Raw data in MS Access format.
- Spatial data in Arcview format including original rover files, base files and differentially corrected files (if applicable) included on diskette, zip drive or CD; FGDC compliant metadata (the Principle Investigator should work closely with the Network Coordinator on metadata needs).
- Voucher specimens (1 wet specimens of each species caught, wet specimens of incidentals [e.g., road kills], anuran recordings, etc.: see the Study Plan for details).

(Note – Data entry into NPSpecies, NPBIB, the Dataset Catalog, and ANCS+ will be performed by the Network Coordinator and/or the Network Data Technician.)

PROJECT SCHEDULE:

April-September 2002. All methods will be employed at all parks. Investigators will start the field season at the southernmost parks (i.e., Scotts Bluff NM) and work their way northward.

April-September 2003. All methods will be employed at all parks. Investigators will start the field season at the southernmost parks (i.e., Scotts Bluff NM) and work their way northward.

December 2003. Principle Investigator submits to the NGP Network Coordinator all products identified above (unless otherwise directed by the NGP Network Coordinator).

PERSONNEL HOURS:

Activity	FY02	FY03	FY04	Total
Time area constrained searches	375	375		750
Cover boards	100	80		180
Calling surveys	40	40		80
Night road driving and walking	40	40		80
Study design	120	40		160
Travel between sites	100	100		200
Report writing		40	250	290
Miscellaneous	100	100	50	250
Total	875	815	300	1990

* In addition, the NGP Network will contribute a minimum of 80 hours of personnel time to the field inventories.

BUDGET:

Expense	FY02	FY03	FY04	Total
Principle Investigator (420 hours)	$8,000	$8,000	$3,500	$19,500
Technicians (1,570 hours)	$8,900	$8,900	$0	$17,800
Supplies	$1,500	$500	$500	$2,500
Vehicle Use ($0.32 per mile)	$1,752	$1,752	$0	$3,504
Lodging and per diem	$6,000	$6,000	$0	$12,000
Indirect Costs (15 %)	$3,923	$3,773	$600	$8,296
Total	$30,075	$28,925	$4,600	$63,600

Revised project in FY03 to 1) add $1,500 to perform data entry and review in NPSpecies, 2) add $10k worth of inventories on the Niobrara NSR, 3) expand the work on the Missouri NRR and add $10k, and 4) extend the project to September 30, 2004.